Code: **MEMD2T1**

PVP 12

I M.Tech - II Semester - Regular Examinations - August 2014

ADVANCED OPTIMIZATION TECHNIQUES
(MACHINE DESIGN)

Duration: 3 hours Marks: 5X14=70

Answer any FIVE questions. All questions carry equal marks

1. Minimize $Z = x_1 + x_2 + x_3$

   Subject to $x_1 - 3x_2 + 4x_3 = 5$

   $x_1 - 2x_2 \leq 3$

   $2x_2 + x_3 \geq 4$

   $x_j \geq 0\ (j = 1, 2, 3)$ 14 M

2. Five jobs are to be assigned to 5 machines to minimize the total time required to process the jobs on machines. The times in hours for processing each job on each machine are given in the matrix below. By using assignment algorithm make the assignment for minimizing the time of processing. 14 M

Machines (time in hours)

Jobs					
A	2	4	3	5	4
B	7	4	6	8	4
C	2	9	8	10	4
D	8	6	12	7	4
E	2	8	5	6	8

3. Minimize $f = x_1^2 + 2x_2^2 + 3x_3^2$
   Subject to the constraints $x_1 - x_2 - 2x_3 \leq 12$
   $x_1 + 2x_2 - 3x_3 \leq 8$
   using Kuhn Tucker conditions. 14 M

4. Perform two iterations of the Newton's method to minimize the function $f(x_1, x_2) = 100(x_2 - x_1^2)^2 + (1 - x_1)^2$
   from the starting point $\begin{Bmatrix} -1.2 \\ 1.0 \end{Bmatrix}$ 14 M

5. How does Genetic Algorithms differ from traditional methods of optimization? Explain in brief various genetic operators. 14 M

6. Explain the concept of random population generation in genetic programming. 14 M

7. Use Dynamic Programming to :
   Maximize $30x_1 + 80x_2 + 65x_3$
   subject to $x_1 + 3x_2 + 2x_3 \leq 5$ and all x_i are ≥ 0. 14 M

8. Formulate a constrained model to optimize the cost of a manufacturing a component based on the type of material available, cost of the raw material and machining cost of the material.

14M